



AN OBSERVATIONAL CLINICAL STUDY TO EVALUATE THE ORAL CAVITY INVOLVEMENT IN PATIENTS OF MUCORMYCOSIS DURING COVID-19 PANDEMIC IN CIMS HOSPITAL, BILASPUR, CHHATTISGARH

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ABSTRACT

Background: Mucormycosis is an angio-invasive fungal infection due to fungi of the order Mucorales. This is known to occur in patients with uncontrolled diabetes, post transplant and cancer. Most individuals are exposed to these fungi on a daily basis, but people with weakened immune systems are more susceptible to infection. The infection begins in the nose and para nasal sinuses due to inhalation of fungal spores. The infection can spread to orbital and intracranial structures either by direct invasion or through the blood vessels. The fungus invades the arteries leading to thrombosis that subsequently causes necrosis of hard and soft tissues. Early diagnosis and prompt treatment can reduce the mortality and morbidity of this lethal fungal infection. The first case in Bilaspur was reported on 19th May 2021 during the peak of second wave of covid-19 in Bilaspur division.

Objective: To evaluate the involvement of oral cavity in patients of mucormycosis during Covid-19 pandemic in CIMS hospital, Bilaspur, Chhattisgarh. **Method:** This prospective observational clinical study is conducted in CIMS hospital Bilaspur, Chhattisgarh. The clinical data from mucormycosis (Black Fungus) ward during the covid-19 pandemic is collected, analyzed and studied. **Result:** The total IPD registered in CIMS hospital, mucormycosis ward is 36 till 15 June 2021. 10 out of 36 patients belonged to 18-45 years age group and 72.22% in >45 year age group. 63.88% patients were male whereas female patients were 13. 25 out of 36(65.44%) patients of lower socioeconomic status were registered in IPD, 16 out of 36 patients were admitted with the chief complains of swelling over face out of these 27.77% patients had swelling over right side of face and rest were having that on left. Swelling over face was accompanied by dull pain which was seen in 21 patients. Maxilla was predominantly involved in 9 patients, 6 were having disease lateralized to right side and 3 were having maxillary involvement on left. Hard palate and Buccal Mucosa was involved in 2 patients each, 1 patient had disease over right lower alveolus. **Conclusion:** Majority of patients admitted in mucormycosis ward were old aged low SES male having multiple co-morbid conditions and with positive history of covid-19 infection. Painful swelling over face and eyes were seen predominately in most of the patients

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INTRODUCTION

Mucormycosis (Zygomycosis, phycomycosis) is an acute opportunistic infection caused by a saprophytic fungus that belongs to the class of phycomycetes. Although several genera are associated with this disease, the most common forms are Rhizopus, Rhizomucor and Absida. Rhizopus is the predominant pathogen accounting for 90% of the cases of rhinocerebralmucormycosis. [1] This microbe may be cultured from the oral cavity, nasal passages, throat and stool of healthy patients without clinical signs of infection. The predisposing factors for mucormycosis are uncontrolled diabetes (particularly in patients with ketoacidosis), malignancies such as lymphomas and leukemia's, renal failure, organ transplant, long-term corticosteroid and immunosuppressive therapy,

cirrhosis, burns, protein energy malnutrition and acquired immune deficiency syndrome. The first case of mucormycosis in Bilaspur was reported on 19th May 2021 during the peak of second wave of covid-19 in Bilaspur division. Usually mucormycosis occurs as a pulmonary, gastrointestinal, disseminated or rhinocerebral infection. Disseminated involvement of mucormycosis is observed in diabetics with ketoacidosis, which favors rapid proliferation of fungus and its invasion into orbit and cerebrum. [2]

Both *Aspergillus* and *Candida* have been reported as the main fungal pathogens for co-infection in people with COVID-19. [3] Recently, several cases of mucormycosis in people with COVID-19 have been increasingly reported world-wide, in particular from India. The primary reason that appears to be facilitating Mucorales spores to germinate in people with

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COVID-19 is an ideal environment of low oxygen (hypoxia), high glucose (diabetes, new-onset hyperglycemia), steroid-induced hyperglycemia, acidic medium (metabolic acidosis, diabetic ketoacidosis [DKA]), high iron levels (increased ferritins) and decreased phagocytic activity of white blood cells (WBC) due to immunosuppression (SARS-CoV-2 mediated, steroid-mediated or background co-morbidities) coupled with several other shared risk factors including prolonged hospitalization with or without mechanical ventilators. The diagnostic approach to oral mycotic conditions was focused on both clinical and cytological/histopathological examinations of the oral tissues. In most times, biopsy-based diagnosis helped in confirming clinically identified fungal conditions. In addition, microbial isolation, identification, culture, and antifungal susceptibility provided standard therapeutic care. [4]

Objective: To evaluate the involvement of oral cavity in patients of mucormycosis during Covid-19 pandemic in CIMS hospital, Bilaspur, Chhattisgarh.

MATERIAL AND METHOD

Method

This prospective observational clinical study is conducted in department of Dentistry, CIMS hospital Bilaspur, Chhattisgarh. The clinical data from mucormycosis (Black Fungus) ward during the covid-19 pandemic is collected, analyzed and studied.

Major Variables

1. Age
2. Gender
3. Socioeconomic status
4. Clinical Presentation
5. Site of involvement
6. Association of Covid-19 with mucormycosis

RESULTS

This prospective observational clinical study involved IPD data of 36 mucormycosis patients who were admitted and treated in Black Fungus ward from 19th May 2021 to till the date. This study is conducted in department of Dentistry, CIMS hospital, Bilaspur Chhattisgarh. The results are as follows

Age

10 out of 36 patients (27.77%) belonged to 18-45 year age group and 72.22% in >45 year age group there, were no patients below 18 yrs. This data shows that middle aged and old patients were predominantly affected by Black Fungus than young patients.

Table 1 Age wise distribution of patients

Age Range(yr)	< 18	18-45	> 45
N = 30	0	10(27.77%)	26(72.22%)

Gender

23 out of 36 (63.88%) patients were male whereas female patients were 13(36.11%); no patients of transgender community were reported. This data revealed that the mucormycosis affected the male patients predominantly than female during covid-19 pandemic.

Table 2 Gender wise Distribution of patients

Gender	Male	Female	Transgender
N = 30	23(63.88%)	13(36.11%)	0

Socio-economic status

25 out of 36(69.44%) patients of lower socioeconomic status were registered in IPD, on the other hand 19.44% patients were of middle class SES and only 11.11% were of upper class SES. This data clearly stated that the patients of lower socioeconomic strata were affected more by mucormycosis than other SES group.

Table 3 Socio-economic status wise distribution of patients

SES	Lower Class	Middle Class	Upper Class	Total
Percentage	25(69.44%)	7(19.44%)	4(11.11%)	36

Clinical Presentation of disease in oral cavity

16 out of 36 patients were admitted with the chief complains of swelling over face out of these 27.77% patients had swelling over right side of face and rest were having that on left. Ulcerative growth was seen in 8 patients. Swelling over face was accompanied by dull pain which was seen in 21 patients, toothache was complained by 6 patients. Mobile teeth were seen in 3 patients.

Table 4 Clinical Feature wise distribution

C/F	Swelling Face N = 16	Pain over Face N = 21	Oral ulcer N = 8	Toothache N = 6	Mobile teeth N = 5
Right	10(27.77%)	17(47.22%)	6(75%)	4(11.11%)	4(80%)
Left	6(16.66%)	6(16.66%)	2(25%)	2(5.55%)	1(20%)

Site wise distribution of disease

Maxilla was predominantly involved in 9 patients, 6 were having disease lateralized to right side and 3 were having maxillary involvement on left. Hard palate and Buccal Mucosa was involved in 2 patients each, 1 patient had disease over right lower alveolus.

Table 5 Site wise involvement

Site	Maxilla N = 9	Hard palate N = 2	Buccal mucosa N = 2	Alveolus N = 1
Right	6(66.66%)	2(100%)	2(100%)	1(100%)
Left	3(33.33%)	0	0	0

Association of Covid-19 with mucormycosis patients

28 out of 36(77.77%) patients of mucormycosis had the history of covid-19 positivity and its management consequently; only 22.22% patients did not have the covid-19 positive history. This data clearly states that mucormycosis was predominant in those patients who had the positive history of covid-19 infection.

Table 6 Association of Covid-19 with mucormycosis patients

Association with Covid-19	Covid-19 positive	Covid-19 Negative
N = 36	28(77.77%)	8(22.22%)

DISCUSSION

Globally, the prevalence of mucormycosis varied from 0.005 to 1.7 per million populations, while its prevalence is nearly 80 times higher (0.14 per 1000) in India compared to developed countries, in a recent estimate of year 2019–2020. [5] Nevertheless, DM remains the leading risk factor associated

with mucormycosis globally, with an overall mortality of 46%. While long term use of corticosteroids has often been associated with several opportunistic fungal infection including aspergillosis and mucormycosis, even a short course of corticosteroids has recently been reported to link with mucormycosis especially in people with DM. A cumulative prednisone dose of greater than 600 mg or a total methyl prednisone dose of 2–7 g given during the month before, predisposes immunocompromised people to mucormycosis.^[6] Surprisingly, 46% of the patients had received corticosteroids within the month before the diagnosis of mucormycosis in the European Confederation of Medical Mycology study.^[7] In a data of 465 cases of mucormycosis without COVID-19 in India, Patel *et al.* has shown that rhino-orbital presentation was the most common (67.7%), followed by pulmonary (13.3%) and cutaneous type (10.5%). The predisposing factors associated with mucormycosis in Indians include DM (73.5%), malignancy (9.0%) and organ transplantation (7.7%).^[10] The role of dentist is of immense importance because mucormycosis primarily occurs around rhinomaxillary or rhinocerebral areas involving facial tissues, palate, alveolar bone and mandibular bone. Inhalation through nasal passage or infection of extraction sockets with sporangiospores in immunocompromised patients always involve larger areas necrosis and with systemic dissemination. These findings need a relook in the context of COVID-19 pandemic where corticosteroids are often being used. There has been a steep rise in case reports/series of mucormycosis in people with COVID-19 especially in India. ROCM is the commonest variety seen in clinical practice world-wide.^[8] It should be noted that term ROCM refers to the entire spectrum ranging from limited sino-nasal disease (sino-nasal tissue invasion), limited rhino-orbital disease (progression to orbits) to rhino-orbital-cerebral disease (CNS involvement).^[9]

CONCLUSION

Majority of patients admitted in mucormycosis ward were old aged low SES male having multiple co-morbid conditions and with positive history of covid-19 infection. Painful swelling over face was complained by most of the patients. Maxilla was predominately involved followed by hard palate and buccal mucosa.

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